Appendix G. Sensitivity Analysis of Mean Willingness to Pay

In this appendix we show how the lower-bound estimate of mean WTP per household, estimated at $184.55 in Section 7.1, would change if the proportions of votes for the alum treatment program were adjusted to account for three factors: respondent uncertainty, acceptance of the scenario, and understanding of the tradeoff.

G.1 Uncertainty

To test the sensitivity of votes to respondent uncertainty, all votes by respondents who voted for the program but were "slightly sure" or "not at all sure" were changed to a vote *against* the program. All other votes were left unchanged. Column 3 of Table G.1 presents the resulting estimated vote probabilities. An F test comparing these probabilities to the original probabilities (Column 2) across all the bid amounts finds a significant difference: $F(6,63) = 4.12$; $p = 0.002$.

Table G.1. Comparison of votes across sensitivity analyses

Bid amount	Proportion of votes for the program	Proportion of votes adjusted for uncertainty	Proportion of votes adjusted for scenario acceptance and certainty	Proportion of votes adjusted for interviewer assessment
$10	81.5%	77.4%	81.8%	81.2%
$45	70.1%	66.2%	76.7%	69.7%
$80	60.9%	58.5%	76.4%	60.9%
$125	60.9%	58.5%	70.7%	60.9%
$205	43.5%	42.5%	62.0%	42.9%
$405	34.2%	33.2%	34.0%	33.1%
N	1,093	1,1093	1,080	1,026

M

G.2 Scenario Acceptance and Certainty

The second adjustment is that described in Section 6.7.2, where respondents' votes are investigated regarding the following issues:

- **Plan implementation without the ban**: No respondents believed that the program might be carried out even if a ban on future spreading of litter is not implemented.
- **Natural recovery**: All respondents believed that natural recovery of the river and lake would take the amounts of time stated in the scenario.
- **Effectiveness of the program**: All respondents believed that the program would be at least moderately effective.
- **Actual program cost of the program**: All respondents believed that the actual cost of the program matched the stated cost.
- **Tax used to clean other rivers/lakes**: All respondents believed that the tax funds would not be used to clean up other rivers and lakes in Oklahoma in addition to Tenkiller Lake, the Illinois River, and creeks flowing into it.
- **Certainty**: All respondents were at least moderately sure of their vote choice.

Column 4 of Table G.1 presents the estimated vote probabilities under these conditions of scenario acceptance and certainty. An F test comparing these probabilities to the original probabilities across all the bid amounts finds a significant difference: $F(6,63) = 7.54$; $p < 0.001$.

G.3 Interviewer Assessment of Understanding of Tradeoff

Economic value is defined in terms of a tradeoff – it is the amount of money that a person would be willing to exchange for the item in question. As explained in Chapter 3, great effort was taken in the course of developing and testing the survey instrument to ensure that the respondents to the survey understood the tradeoff being presented to them. But, it is almost inevitable that a few respondents may not understand all the material being presented.

Sixty-seven out of 1.093 respondents to the survey, or 5.3%, either understood the material slightly or not at all, or said something suggesting difficulty in understanding what was told, or had difficulty understanding the vote question, or did not think at all seriously about the decision about how to vote according to their interviewer. It is possible that some of these respondents were not as thoughtfully engaged with the trade-off as one might have liked. Therefore an analysis was conducted dropping those 67 respondents from the data. Column 5 of Table G.1 presents the estimated vote probabilities when these respondents are omitted. A t-test comparing the overall estimated vote probability of the 67 omitted respondents with that of the respondents in the rest of the sample finds no significant difference between the two samples: $t(74.69) = 0.17$, $p = 0.867$.

G.4 WTP Estimates

Table G.2 presents the lower-bound estimates of the mean WTP per household corresponding to three sensitivity adjustments.

The first adjustment, shown in the second row of Table G.2, is that described in section 1 above: for all respondents who voted for the program but were "slightly sure" or "not at all sure," their vote was changed to a vote against the program. The lower-bound estimate of mean WTP is calculated using the proportions in column 3 of Table G.1.

The second adjustment, shown in the third row of Table G.2, is that described in Section G.2 above, using the predicted probabilities based on the scenario acceptance and certainty adjustments. The lower-bound estimate of mean WTP is calculated using the predicted mean vote probabilities shown in column 4 of Table G.1.

The third adjustment, shown in the last row of Table G.2, is that described in Section G.3 above, dropping the 67 respondents who understood the material slightly or not at all, or said something suggesting difficulty in understanding what was told, or had difficulty understanding the vote question, or did not think at all seriously about the decision about how to vote. The lower-bound estimate of mean WTP is calculated using the proportions in column 5 of Table G.1.

Table G.2. Sensitivity adjustment of lower-bound estimate of mean WTP per household

Sensitivity adjustment	Estimate of mean WTP	Standard error of estimate	Confidence intervals
Estimate from Chapter 7	$184.55	$9.61	$165.72–203.38
Uncertainty	$178.08	$10.39	$157.72–198.44
Scenario acceptance and certainty	$211.04	$4.22	$202.77–219.32
Interviewer assessment of understanding of tradeoff	$181.81	$9.31	$163.57–200.05